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*International Journal Of
Magnetics And
Electromagnetism*

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DRAKE SWEENEY

Permanent Magnet Synchronous Machines and Drives Elsevier

The demand for new and effective methods for the evaluation, maintenance and live-time testing of objects in fields as diverse as engineering, medicine and art, continues to grow. Electromagnetic non-destructive evaluation is a process by which an object can be assessed without permanent alteration by means of inducing electric currents or magnetic fields within the object and observing the electromagnetic response. This book

presents selected papers from the 18th International Workshop on Electromagnetic Non-destructive Evaluation (ENDE), which was held in Bratislava, Slovak Republic, on June 25-28, 2013. The aim of the workshop was to provide an international forum for the discussion of the state-of-the-art and perspectives in the field from the view of science, technology and engineering. The book is divided into five main sections: advanced sensors; analytical and numerical modeling and biomedical applications; innovative industrial applications; new developments; and, solutions of inverse problems. Containing 40 peer-reviewed papers, it will be of interest to all those whose

work involves electromagnetic non-destructive evaluation, whatever their discipline.

Smart Actuation and Sensing Systems IOS Press

This volume includes contributions on: field theory and advanced computational electromagnetics; electrical machines and transformers; optimization and interactive design; electromagnetics in materials; coupled field and electromagnetic components in mechatronics; induction heating systems; bioelectromagnetics; and electromagnetics in education.

New Trends in Nanoparticle Magnetism BoD - Books on Demand

Written by specialists of modeling in electromagnetism, this book provides a comprehensive review of the finite

element method for low frequency applications. Fundamentals of the method as well as new advances in the field are described in detail. Chapters 1 to 4 present general 2D and 3D static and dynamic formulations by the use of scalar and vector unknowns and adapted interpolations for the fields (nodal, edge, face or volume). Chapter 5 is dedicated to the presentation of different macroscopic behavior laws of materials and their implementation in a finite element context: anisotropy and hysteretic properties for magnetic sheets, iron losses, non-linear permanent magnets and superconductors. More specific formulations are then proposed: the modeling of thin regions when finite elements become misfit (Chapter 6),

infinite domains by using geometrical transformations (Chapter 7), the coupling of 2D and 3D formulations with circuit equations (Chapter 8), taking into account the movement, particularly in the presence of Eddy currents (Chapter 9) and an original approach for the treatment of geometrical symmetries when the sources are not symmetric (Chapter 10). Chapters 11 to 13 are devoted to coupled problems: magneto-thermal coupling for induction heating, magneto-mechanical coupling by introducing the notion of strong and weak coupling and magneto-hydrodynamical coupling focusing on electromagnetic instabilities in fluid conductors. Chapter 14 presents different meshing methods in the context of electromagnetism (presence

of air) and introduces self-adaptive mesh refinement procedures. Optimization techniques are then covered in Chapter 15, with the adaptation of deterministic and probabilistic methods to the numerical finite element environment. Chapter 16 presents a variational approach of electromagnetism, showing how Maxwell equations are derived from thermodynamic principles.

Spotlight on Modern Transformer Design
John Wiley & Sons

This completely updated second edition of an Artech House classic covers industrial applications and space and biomedical applications of magnetic sensors and magnetometers. With the advancement of smart grids, renewable energy resources, and electric vehicles, the importance of electric current

sensors increased, and the book has been updated to reflect these changes. Integrated fluxgate single-chip magnetometers are presented. GMR sensors in the automotive market, especially for end-of-shaft angular sensors, are included, as well as Linear TMR sensors. Vertical Hall sensors and sensors with integrated ferromagnetic concentrators are two competing technologies, which both brought 3-axial single-chip Hall ICs, are considered. Digital fluxgate magnetometers for both satellite and ground-based applications are discussed. All-optical resonant magnetometers, based on the Coherent Population Trapping effect, has reached approval in space, and is covered in this new edition of the book. Whether you're an expert or new to the field, this unique

resource offers you a thorough overview of the principles and design of magnetic sensors and magnetometers, as well as guidance in applying specific devices in the real world. The book covers both multi-channel and gradiometric magnetometer systems, special problems such as cross-talk and crossfield sensitivity, and comparisons between different sensors and magnetometers with respect to various application areas. Miniaturization and the use of new materials in magnetic sensors are also discussed. A comprehensive list of references to journal articles, books, proceedings and webpages helps you find additional information quickly.

**Mechanical Design and
Manufacturing of Electric Motors**

Artech House

Seismoelectric coupling and its current and potential future applications The seismoelectric method—the naturally-occurring coupling of seismic waves to electromagnetic fields—can provide insight into important properties of porous media. With a variety of potential environmental and engineering uses, as well as larger scale applications such as earthquake detection and oil and gas exploration, it offers a number of advantages over conventional geophysical methods. *Seismoelectric Exploration: Theory, Experiments, and Applications* explores the coupling between poroelastic and electromagnetic disturbances, discussing laboratory experiments, numerical modeling techniques, recent theoretical

developments, and field studies. Volume highlights include: Physics of the seismoelectric effect at the microscale Governing equations describing coupled seismo-electromagnetic fields Examples of successful seismoelectric field experiments in different geological settings Current and potential applications of seismoelectric coupling Noise removal techniques for seismoelectric field measurements The American Geophysical Union promotes discovery in Earth and space science for the benefit of humanity. Its publications disseminate scientific knowledge and provide resources for researchers, students, and professionals. [International Journal of Infrared and Millimeter Waves](#) IOS Press This combination of textbook and

reference manual provides a comprehensive account of gravity and magnetic methods for exploring the subsurface using surface, marine, airborne and satellite measurements. It describes key current topics and techniques, physical properties of rocks and other Earth materials, and digital data analysis methods used to process and interpret anomalies for subsurface information. Each chapter starts with an overview and concludes by listing key concepts to consolidate new learning. An accompanying website presents problem sets and interactive computer-based exercises, providing hands-on experience of processing, modeling and interpreting data. A comprehensive online suite of full-color case histories illustrates the practical utility of modern

gravity and magnetic surveys. This is an ideal text for advanced undergraduate and graduate courses and reference text for research academics and professional geophysicists. It is a valuable resource for all those interested in petroleum, engineering, mineral, environmental, geological and archeological exploration of the lithosphere.

Electromagnetic Nondestructive Evaluation (XVII) CRC Press

The field of thermal therapy has been growing tenaciously in the last few decades. The application of heat to living tissues, from mild hyperthermia to high-temperature thermal ablation, has produced a host of well-documented genetic, cellular, and physiological responses that are being researched intensely for medical applications,

particularly fo
Electromagnetic Fields in Electrical
 Engineering Springer Science & Business
 Media

This handbook presents a comprehensive survey of magnetism and magnetic materials. The dramatic advances in information technology and electromagnetic engineering make it necessary to systematically review the approved key knowledge and summarize the state of the art in this vast field within one seminal reference work. The book thus delivers up-to-date and well-structured information on a wealth of topics encompassing all fundamental aspects of the underlying physics and materials science, as well as advanced experimental methodology and applications. It features coverage of the

host of fascinating and complex phenomena that arise from the use of magnetic fields in e.g. chemistry and biology. Edited by two internationally renowned scholars and featuring authored chapters from leading experts in the field, Springer's Handbook of Magnetism and Magnetic Materials is an invaluable source of essential reference information for a broad audience of students, researchers, and magnetism professionals.

Fundamenta Informaticae BoD – Books on Demand

This book includes the original, peer-reviewed research papers from the 9th Frontier Academic Forum of Electrical Engineering (FAFEE 2020), held in Xi'an, China, in August 2020. It gathers the latest research, innovations, and

applications in the fields of Electrical Engineering. The topics it covers including electrical materials and equipment, electrical energy storage and device, power electronics and drives, new energy electric power system equipment, IntelliSense and intelligent equipment, biological electromagnetism and its applications, and insulation and discharge computation for power equipment. Given its scope, the book benefits all researchers, engineers, and graduate students who want to learn about cutting-edge advances in Electrical Engineering.

Rare Earth Permanent-Magnet Alloys' High Temperature Phase Transformation Courier Corporation
This book provides comprehensive coverage of the most recent progress

and developments in the field of magnetic nanoparticles, with special emphasis on new materials design approaches for magnetic nanoarchitectures, advanced characterization techniques, and a wide range of applications areas including permanent magnets, biomedicine, and life sciences. The book also features an exhaustive section on fundamentals, covering single particle effects, surface effects, and interparticle interactions. The book delivers a strong focus throughout on the multidisciplinary of the subject spanning physics, chemistry, engineering, biology, medicine, and environmental science. This forward-looking contributed volume highlights future perspectives and areas of emerging research, and will be of great

interest to advanced undergraduates, as well as researchers in academia and industry.

Magnetism Springer Science & Business Media

This book presents a numerical scheme for the solution of field problems governed by partial differential equations: the cell method. The technique lends itself naturally to the solution of multiphysics problems with several interacting phenomena. The Cell Method, based on a space-time tessellation, is intimately related to the work of Tonti and to his ideas of classification diagrams or, as they are nowadays called, Tonti diagrams: a graphical representation of the problem's equations made possible by a suitable selection of a space-time

framework relating physical variables to each other. The main features of the cell method are presented and links with many other discrete numerical methods (finite integration techniques, finite difference time domain, finite volumes, mimetic finite differences, etc.) are discussed. After outlining the theoretical basis of the method, a set of physical problems which have been solved with the cell method is described. These single and multiphysics problems stem from the authors' research experience in the fields of electromagnetism, elasticity, thermo-elasticity and others. Finally, the implementation of the numerical technique is described in all its main components: space-time discretization, problem formulation, solution and representation of the

resulting physical fields.

Electromagnetics and Calculation of Fields Springer Nature

The objective of the present book, which tries to summarize in an edited format and in a fairly comprehensive manner, many of the recent technical research accomplishments in the area of Smart Actuators and Smart Sensors, is to combine researchers and scientists from different fields into a single virtual room. The book hence reflects the multicultural nature of the field and will allow the reader to taste and appreciate different points of view, different engineering methods and different tools that must be jointly considered when designing and realizing smart actuation and sensing systems.

Seismoelectric Exploration Springer

Science & Business Media

This Second Edition of *Mechanical Design and Manufacturing of Electric Motors* provides in-depth knowledge of design methods and developments of electric motors in the context of rapid increases in energy consumption, and emphasis on environmental protection, alongside new technology in 3D printing, robots, nanotechnology, and digital techniques, and the challenges these pose to the motor industry. From motor classification and design of motor components to model setup and material and bearing selections, this comprehensive text covers the fundamentals of practical design and design-related issues, modeling and simulation, engineering analysis, manufacturing processes, testing

procedures, and performance characteristics of electric motors today. This Second Edition adds three brand new chapters on motor breaks, motor sensors, and power transmission and gearing systems. Using a practical approach, with a focus on innovative design and applications, the book contains a thorough discussion of major components and subsystems, such as rotors, shafts, stators, and frames, alongside various cooling techniques, including natural and forced air, direct- and indirect-liquid, phase change, and other newly-emerged innovative cooling methods. It also analyzes the calculation of motor power losses, motor vibration, and acoustic noise issues, and presents engineering analysis methods and case-study results. While suitable for motor

engineers, designers, manufacturers, and end users, the book will also be of interest to maintenance personnel, undergraduate and graduate students, and academic researchers.

Publications of Los Alamos Research

Springer Science & Business Media

Computer-aided design has come of age in the magnetic devices industry. From its early beginnings in the 1960s, when the precision needs of the experimental physics community first created a need for computational aids to magnet design, CAD software has grown to occupy an important spot in the industrial designer's tool kit. Numerous commercial CAD systems are now available for magnetics work, and many more software packages are used in-house by large industrial firms. While

their capabilities vary, all these software systems share a very substantial common core of both methodology and objectives. The present need, particularly in medium-sized and nonspecialist firms, is for an understanding of how to make effective use of these new and immensely powerful tools: what approximations are inherent in the methods, what quantities can be calculated, and how to relate the computed results to the needs of the designer. These new analysis techniques profoundly affect the designer's approach to problems, since the analytic tools available exert a strong influence on the conceptual models people build, and these in turn dictate the manner in which they formulate problems. The impact of CAD is just beginning to be felt

industrially, and the authors believe this is an early, but not too early, time to collect together some of the experience which has now accumulated among industrial and research users of magnetics analysis systems.

Current Trends in Mineral-Based Products and Utilization of Wastes: Recent Studies from India Springer Nature

Modern Hybrid Electric Vehicles provides vital guidance to help a new generation of engineers master the principles of and further advance hybrid vehicle technology. The authors address purely electric, hybrid electric, plug-in hybrid electric, hybrid hydraulic, fuel cell, and off-road hybrid vehicle systems. They focus on the power and propulsion systems for these vehicles, including

issues related to power and energy management. They concentrate on material that is not readily available in other hybrid electric vehicle (HEV) books such as design examples for hybrid vehicles, and cover new developments in the field including electronic CVT, plug-in hybrid, and new power converters and controls. Covers hybrid vs. pure electric, HEV system architecture (including plug-in and hydraulic), off-road and other industrial utility vehicles, non-ground-vehicle applications like ships, locomotives, aircrafts, system reliability, EMC, storage technologies, vehicular power and energy management, diagnostics and prognostics, and electromechanical vibration issues. Contains core fundamentals and principles of modern hybrid vehicles at

component level and system level. Provides graduate students and field engineers with a text suitable for classroom teaching or self-study. *Automotive Power Transmission Systems* Cambridge University Press
Surface Impedance Boundary Conditions is perhaps the first effort to formalize the concept of SIBC or to extend it to higher orders by providing a comprehensive, consistent, and thorough approach to the subject. The product of nearly 12 years of research on surface impedance, this book takes the mystery out of the largely overlooked SIBC. It provides an understanding that will help practitioners select, use, and develop these efficient modeling tools for their own applications. Use of SIBC has often been viewed as an esoteric issue, and they

have been applied in a very limited way, incorporated in computation as an ad hoc means of simplifying the treatment for specific problems. Apply a Surface Impedance "Toolbox" to Develop SIBCs for Any Application The book not only outlines the need for SIBC but also offers a simple, systematic method for constructing SIBC of any order based on a perturbation approach. The formulation of the SIBC within common numerical techniques—such as the boundary integral equations method, the finite element method, and the finite difference method—is discussed in detail and elucidated with specific examples. Since SIBC are often shunned because their implementation usually requires extensive modification of existing software, the authors have mitigated

this problem by developing SIBCs, which can be incorporated within existing software without system modification. The authors also present: Conditions of applicability, and errors to be expected from SIBC inclusion Analysis of theoretical arguments and mathematical relationships Well-known numerical techniques and formulations of SIBC A practical set of guidelines for evaluating SIBC feasibility and maximum errors their use will produce A careful mix of theory and practical aspects, this is an excellent tool to help anyone acquire a solid grasp of SIBC and maximize their implementation potential.

Recent Advances in Novel Drug Carrier Systems CRC Press

A low-dimensional magnet is a key to the next generation of electronic devices. In

some respects, low-dimensional magnets refer to nanomagnets (nanostructured magnets) or single-molecule magnets (molecular nanomagnets). They also include the group of magnetic nanoparticles, which have been widely used in biomedicine, technology, industries, and environmental remediation. Low-dimensional magnetic materials can be used effectively in the future in powerful computers (hard drives, magnetic random-access memory, ultra-low power consumption switches, etc.). The properties of these materials largely depend on the doping level, phase, defects, and morphology. This book covers various nanomagnets and magnetic materials. The basic concepts, various synthetic approaches,

characterizations, and mathematical understanding of nanomaterials are provided. Some fundamental applications of 1D, 2D, and 3D materials are covered. This book provides the fundamentals of low-dimensional magnets along with synthesis, theories, structure-property relations, and applications of ferromagnetic nanomaterials. This book broadens our fundamental understanding of ferromagnetism and mechanisms for realization and advancement in devices with improved energy efficiency and high storage capacity.

Multiobjective Shape Design in Electricity and Magnetism CRC Press

This introduction to electromagnetic fields emphasizes the computation of fields and the development of theoretical

relations. It presents the electromagnetic field and Maxwell's equations with a view toward connecting the disparate applications to the underlying relations, along with computational methods of solving the equations.

Gravity and Magnetic Exploration

Springer

From the ox carts and pottery wheels the spacecrafts and disk drives, efficiency and quality has always been dependent on the engineer's ability to anticipate and control the effects of vibration. And while progress in negating the noise, wear, and inefficiency caused by vibration has been made, more is needed. Modeling and Control of Vibration in Mechanical Systems answers the essential needs of practitioners in

systems and control with the most comprehensive resource available on the subject. Written as a reference for those working in high precision systems, this uniquely accessible volume:

Differentiates between kinds of vibration and their various characteristics and effects Offers a close-up look at mechanical actuation systems that are achieving remarkably high precision positioning performance Includes techniques for rejecting vibrations of different frequency ranges Covers the theoretical developments and principles of control design with detail elaborate enough that readers will be able to apply the techniques with the help of MATLAB® Details a wealth of practical working examples as well as a number of simulation and experimental results

with comprehensive evaluations. The modern world's ever-growing spectra of sophisticated engineering systems such as hard disk drives, aeronautic systems, and manufacturing systems have little tolerance for unanticipated vibration of even the slightest magnitude.

Accordingly, vibration control continues to draw intensive focus from top control engineers and modelers. This resource demonstrates the remarkable results of that focus to date, and most importantly gives today's researchers the technology that they need to build upon into the future. Chunling Du is currently researching modeling and advanced servo control of hard disk drives at the Data Storage Institute in Singapore.

Lihua Xie is the Director of the Centre for Intelligent Machines and a professor at

Nanyang Technological University in Singapore.

Physics of Thermal Therapy John Wiley & Sons

This contribution book collects reviews and original articles from eminent experts working in the interdisciplinary arena of novel drug delivery systems and their uses. From their direct and recent experience, the readers can achieve a wide vision on the new and ongoing potentialities of different drug delivery systems. Since the advent of analytical techniques and capabilities to measure particle sizes in nanometer ranges, there has been tremendous interest in the use of nanoparticles for more efficient methods of drug delivery. On the other hand, this reference discusses advances in the design,

optimization, and adaptation of gene delivery systems for the treatment of cancer, cardiovascular, pulmonary,

genetic, and infectious diseases, and considers assessment and review procedures involved in the development of gene-based pharmaceuticals.